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Indian Standard

METHOD OF TEST FOR VIBRATION MEASUREMENT FOR INDUSTRIAL SEWING MACHINES

ICS 17.160; 61.080

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Price Group 2

Sewing Machines Sectional Committee, ME 29

FORWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Sewing Machines Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard is one of the series of standards prepared to rationalize the method of tests for industrial sewing machine and specifies the procedure for measuring vibrations generated by single needle straight lock stitch industrial sewing machines and over edge industrial sewing machines as a vibration level and vibration displacements of industrial sewing machines.

Other standards in this series are:

IS 15312 : 2002 'Method of tests for seam puckering on material sewing by industrial sewing machines'

IS 15314 : 2002 'Method of tests for tightness and balance of stitches on seams, sewn by industrial sewing machines'

In preparation of this standard, assistance has been derived from the following standard issued by the Japanese Industrial Standard Committee:

JIS B 9065 : 1983 'Methods of vibration measurements for industrial sewing machines'

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

METHOD OF TEST FOR VIBRATION MEASUREMENT FOR INDUSTRIAL SEWING MACHINES

1 SCOPE

This standard specifies the method of test for measuring vibrations generated by the single needle straight lock stitch industrial sewing machine and the over edging industrial sewing machines, hereinafter referred to as the sewing machines, as a vibration level of the industrial sewing machine and vibration displacement.

2 DEFINITIONS

For the purpose of this standard, the following definitions shall apply.

2.1 Sewing Machine

The sewing machine means a machine integrated with a standard base/ table, legs and a motor or any driving mechanism.

2.2 Vibration Level of the Industrial Sewing Machine

It means the value of acceleration expressed as 20 $\log_{10}(a/a_0)$ in dB, where a_0 is the reference acceleration of vibration of 10^{-2} m/s^2 and a is the effective value of acceleration of vibration (m/s^2) that is derived from the vibration response as shown in Table 1 and Fig. 1.

Table 1 Vibration Response

(*Clause* 2.2)

Sl No.	Frequency Hz	Relative Response dB	Allowable Deviation dB
(1)	(2)	(3)	(4)
i)	Up to and including 5	– 12 and below	—
ii)	> 5 ≤ 10	0	+ 1 – 3
iii)	> 10 ≤ 20	0	± 1
iv)	> 20 ≤ 500	0	± 1
v)	> 500 ≤ 1 000	0	± 1
vi)	> 1 000 ≤ 2 000	0	+ 1 – 3
vii)	2 000 and above	– 18 and below	—

2.3 Vibration Displacement

It means the value of *p-p* expressed as a deviation from a rest point due to vibrations within the range of 10 to 1 000 Hz and it shall be expressed in micrometres (µm).

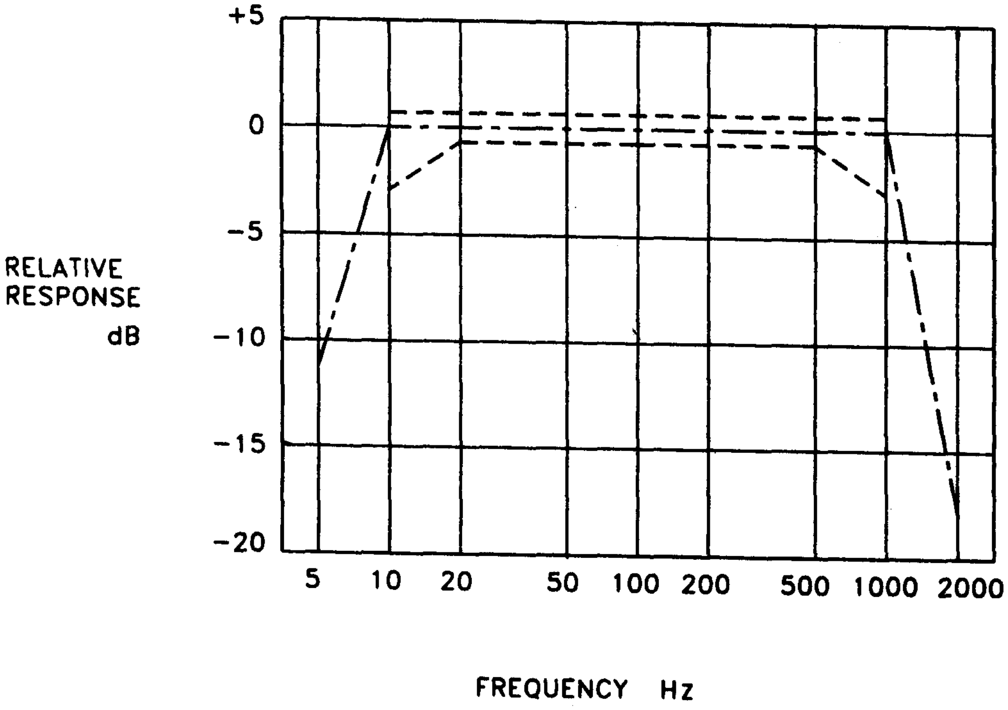


FIG. 1 VIBRATION RESPONSE

3 MEASURING INSTRUMENTS

The measuring instrument to be used in this standard shall be integrated with a vibration pick-up, vibration pick-up fixture, amplifier, processing circuit, detector, and indicator, and shall have the following characteristics:

a) The measuring range of the vibration level of the industrial sewing machine shall be from 0 to 90 dB.

b) The measuring range of vibration displacement shall be from 1 to 3 000 µm.

c) The vibration pick-up shall be suitable for measurement of the acceleration of vibration and vibration displacement within the frequency range of 10 to 1 000 Hz and shall be 50g or less in mass.

d) The processing circuit shall have performance necessary for the calculation of the vibration level of the industrial sewing machine and vibration displacement as defined at **2.1** and **2.2**.

e) The indicator shall have two different scales to indicate the vibration level of the industrial sewing machine and the vibration displacement, and shall be capable of indicating the effective value of acceleration of vibration and the value of *p-p* or the peak value.

f) The material, shape and size of the pick-up fixture shall be as shown in Fig. 2 and Fig. 3.

4 METHOD OF MEASUREMENT

4.1 Measuring Place

4.1.1 Measurement shall be made in such a place that the readings are not influenced due to the outside vibrations.

4.1.2 In measurement, care shall be taken so that the measured values of vibration are not affected by the boundary conditions such as temperature, humidity, wind noise and electromagnetic field.

4.2 Conditions for Installation

4.2.1 The sewing machine shall be founded on a flat, horizontal and rigid floor. If a gap between table legs and the floor surface is appreciable, it shall be adjusted by controlling the leg length.

4.2.2 The table shall be set horizontally and the height of the top of the table from the floor shall be 750 ± 30 mm.

4.3 Operating Conditions

The sewing machine shall, without using thread or cloth, be operated in accordance with the following conditions:

a) The sewing machine shall be operated at a feed of 2 to 3 mm, being detached the pressure foot.

b) The operating speed of the sewing machine shall be 90 percent of the maximum stated in its instruction manual.

c) The motor belt shall be kept at a level of tension that is attained when the vibration is in the most stable state.

d) The vibration pick-up shall be fixed firmly to the fixture through a screw hole for the sewing machine's throat plate screw.

4.4 Measuring Directions

Measurement shall be made as shown in Fig. 2 and 3; in the directions of *X*, *Y* and *Z* axis in the case of the single needle straight lock stitch industrial sewing machines, while in the direction of *Z* axis only in the case of the over edging industrial sewing machines.

4.5 Readings of Indicator

Three readings of the indicator shall be taken, in which the maximum value shall be regarded as the representative of the measured value.

5 RECORD OF MEASURED RESULTS

The results of measurement of vibrations which involves the measuring place, operating conditions, and the measured value shall be recorded and, in addition thereto, the following matters shall be added:

a) Type of sewing machine (model),

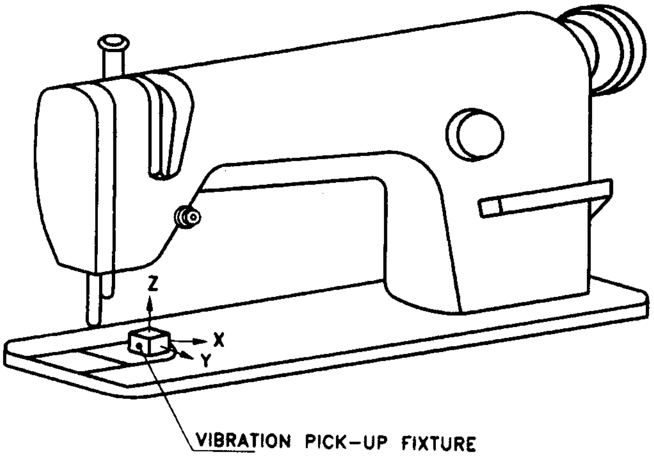
b) Serial No. of sewing machine,

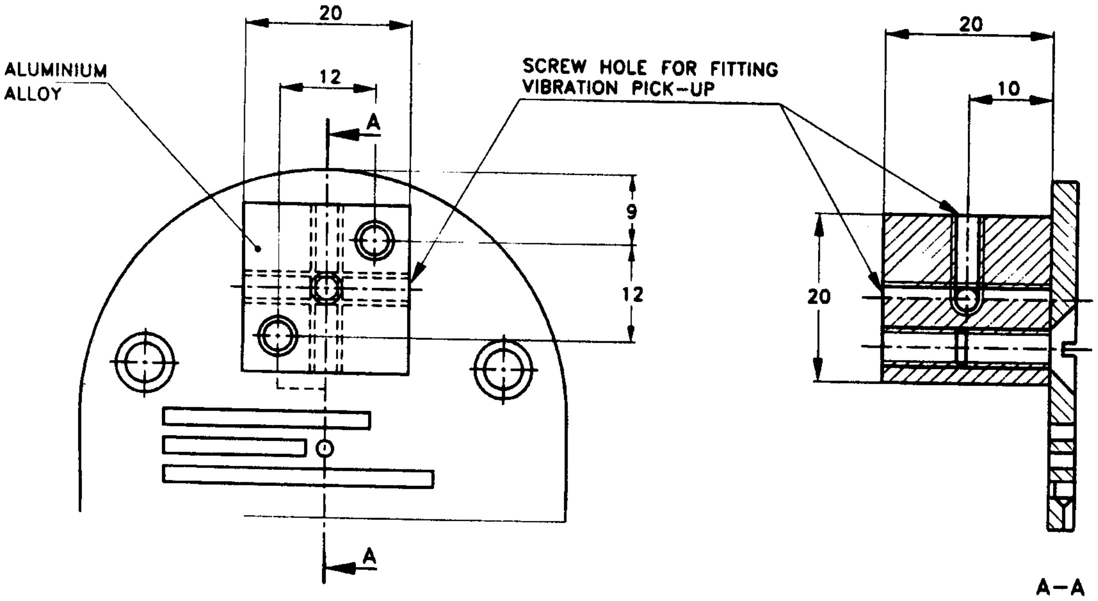
c) Manufacturer's name,

d) Date of measurement,

e) Measurement instrument (name and type), and

f) Inspector/operator's name or initials.

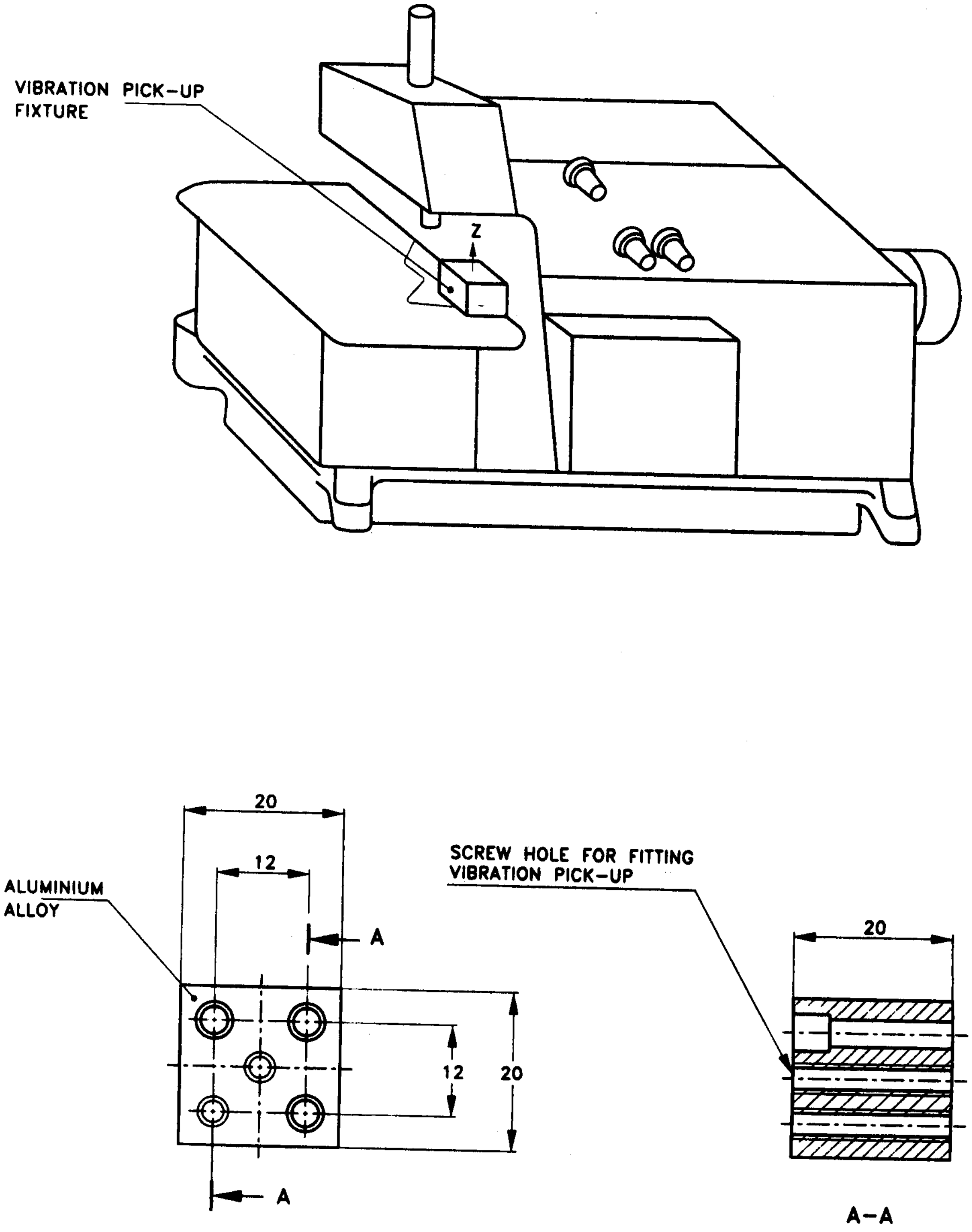




Detailed Drawing of Vibration Pick-Up Fixture

All dimensions in millimetres.

FIG. 2 SINGLE NEEDLE STRAIGHT LOCK STITCH INDUSTRIAL SEWING MACHINE


VIBRATION PICK-UP FIXTURE
Z
ALUMINIUM ALLOY
20
12
A
12
20
A
SCREW HOLE FOR FITTING VIBRATION PICK-UP
20
A–A

Detailed Drawing of Vibration Pick-Up Fixture

All dimensions in millimetres.

Fig. 3 Overedging Industrial Sewing Machine

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002 Telephones : 323 01 31, 323 33 75, 323 94 02	Telegrams: Manaksanstha (Common to all offices)

Regional Offices :	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	323 76 17 323 38 41
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700 054	337 84 99, 337 85 61 337 86 26, 337 91 20
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